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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/646,728	04/27/2001	Shahnaz Jammal	2762-113	6097

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EXAMINER

NGUYEN, NGA B

ART UNIT	PAPER NUMBER
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3628

DATE MAILED: 11/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/646,728

Applicant(s)

JAMMAL ET AL.

Examiner

Nga B. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7, 11</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is the answer to the Amendment filed on August 5, 2004, which paper has been placed of record in the file.
2. Claim 1-24 are pending in this application.

Response to Arguments/Amendment

3. Applicant's arguments with respect to claims 1-24 have been considered but are not persuasive and are moot in view of the new grounds of rejection.

Rejections under 35 USC § 101 (non-statutory subject matter):

Regarding to claims 1-17, applicant amended claim 1 to add the new step of "assessing the risk of the borrower defaulting using the calculated probability of default" does not make the claims statutory because the claimed invention is still not implemented on any specific machine or apparatus. Therefore, examiner decides to maintain the rejection under **35 USC § 101** for claims 1-17 (also see details below).

Rejections under 35 USC § 102 and 103 (Anticipation and Obviousness):

In the arguments, applicant stated that Tom does not teach calculating "a probability of default for the borrower", Tom does not calculate **a probability value** representing the mathematical probability that the loan applicant will default (i.e., a probability of default for the borrower), examiner strongly disagrees. See column 11, lines 5-20, figures 7a, 7b, the final output value is 0.98308 is a probability value because it indicated the risk of the borrower defaulting, in this example the output value

0.98308 indicated the borrower has strong credit worthiness. Therefore, Tom does teach calculating "a probability of default for the borrower".

4. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-17 are rejected under 35 U.S.C 101 because the claimed invention is directed to non-statutory subject matter, particularly, an abstract idea.

The claims, as presently claimed and best understood were reconsidered in light of the "Examination Guidelines for Computer-Related Inventions" and were found to be non-statutory. Discussion of the analysis of the claims under the guidelines follows.

Claims 1-17 merely manipulate an abstract idea that is not within the technological arts. Mere ideas in the abstract (i.e., abstract idea, law of nature, natural phenomena) that do not apply, involve, use, or advance the technological arts fail to promote the "progress of science and the useful arts" (i.e., the physical sciences as opposed to social sciences, for example) and therefore are found to be non-statutory subject matter.

As to claims 1-17, the invention is not implemented on a computer or specific machine or apparatus; therefore, the invention is not directed to the technological arts. To be statutory, the utility of an invention must be within the technological arts. The definition of "technology" is the "application of science and engineering to the development of machines and procedures in order to enhance or improve human conditions, or at least to improve human efficiency in some respect." (Computer Dictionary 384 (Microsoft Press, 2d ed. 1994)). When one looks to the present specification to determine what the applicant has invented, the invention appears to be a series of steps performed on a computer. It is clear that claims 1-17 are intended to be directed to the abstract method apart from the apparatus for performing the method. Therefore, claims 1-17 are non-statutory, because they are directed solely to an abstract idea without practical application in the technological arts.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 18-21, 23, and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Tom, U.S. Patent No. 5,832,465.

Regarding to claim 18, Tom discloses a system for assessing the risk of a plurality of borrowers defaulting on financial obligations within a predefined market, comprising:

means for receiving a plurality of first input indicative of whether the borrower has previously defaulted on a financial obligation (column 4, lines 30-37; receiving bankruptcy indicator);

means for receiving a plurality of second input comprising a plurality of credit factors, the plurality of credit factors comprising a first credit factor and a second credit factor (column 3, line 32-column 4, line 37; column 10, line 51-column 11, line 5; figures 7a, 7b, item "Variable"; receiving a plurality of linguistic evidential values as credit factors contain residence, employment, debt, credit, and miscellaneous);

means for determining, using the plurality of first input and the plurality of second input, a set of weights, each weight in the set being placed on one of plurality of credit factors for each of borrowers (column 4, lines 38-40; column 6, lines 28-31, 62-67;

figures 7a, 7b, item "Input Nodes, Input"; column 9, lines 5-15; translating linguistic evidential values into numeric values using weighting function); and

a general database that contains a record for each borrower, wherein the record includes the corresponding one of the plurality of sets of weights, the plurality of first inputs, and the plurality of second inputs for each borrower (column 3, lines 48-50; column 10, lines 35-50; the financial service applications is retrieved from the data storage unit 22, the data from the financial service application is entered into the model structure 24);

means for processing the record in the general database in order to calculate a probability of default for each of the borrowers (column 11, lines 5-20; figures 7a, 7b, item "Output Node, Output"; calculating a credit worthiness or probability of default for the borrower using linguistic evidential values and numeric values).

Regarding to claim 19, Tom discloses means for graphically outputting the probability of default for each of the borrowers (column 5, lines 15-33).

Regarding to claim 20, Tom discloses a compute program product comprising a computer usable medium having control logic stored therein for causing a computer to assess the risk of a borrower defaulting on a financial obligation within a predefined market, the control logic comprising:

first computer readable program code means for causing the computer to receive a first input indicative of whether the borrower has previously defaulted on a financial obligation (column 4, lines 30-37; receiving bankruptcy indicator);

second computer readable program code means for causing the computer to receiving a second input comprising a plurality of credit factors, the plurality of credit factors comprising a first credit factor and a second credit factor (column 3, line 32-column 4, line 37; column 10, line 51-column 11, line 5; figures 7a, 7b, item "Variable"; receiving a plurality of linguistic evidential values as credit factors contain residence, employment, debt, credit, and miscellaneous);

third computer readable program code means for causing the computer to determine, using the first input and the second input, a set of weights, each weight in the set being placed on one of plurality of credit factors (column 4, lines 38-40; column 6, lines 28-31, 62-67; figures 7a, 7b, item "Input Nodes, Input"; column 9, lines 5-15; translating linguistic evidential values into numeric values using weighting function); and

fourth computer readable program code means for causing the computer to calculate, using the plurality of credit factors and the set of weights, a probability of default for the borrower (column 11, lines 5-20; figures 7a, 7b, item "Output Node, Output"; calculating a credit worthiness or probability of default for the borrower using linguistic evidential values and numeric values).

Regarding to claim 21, Tom discloses third computer readable program code means comprises:

fifth computer readable program code means for causing the computer to set each of the set of weights to a pre-determined value (column 6, lines 27-37; figures 7a, 7b, item "Input Nodes, Input"; the numeric values have pre-determined values range between -1.0 and 1.0);

sixth, seventh, eighth and ninth computer readable program code means for causing the computer to calculate, using the plurality of credit factors and the set of weights, a first probability of default for the borrower; to measure the first probability of default to determine a level of fitness; to determine when the level of fitness is not a good fit; and to set each of the set of weights to a new calculated value when the determining the level of fitness is not a good fit (column 9, line 1-column 10, line 35; column 12, lines 6-13; optimizing the weighting function for each nodes until there is minimal error between the final output and the desired output, thus a first credit worthiness is calculated, the level of fitness is determined by error function, the credit worthiness is continuing calculated until minimizing error function).

Regarding to claim 23, Tom discloses fifth computer readable program code means for causing the computer to graphically output the probability of default for the borrower (column 5, lines 15-33).

Regarding to claim 24, Tom discloses fifth, sixth, seventh computer readable program code means for causing the computer to determine, using the first input, a level of predictive accuracy for the probability of default; to determine, when the level of predicative accuracy satisfies a pre-determined threshold, whether the set of weights are unstable; to generate, when the determining that the set of weights are unstable, a new of weights to be place on each of the plurality of credit factors; whereby the new set of weights are deemed sufficiently accurate and stable to be used as a basis for assessing the risk of default within the predefined market of different, new borrowers (column 9, line 1-column 10, line 35; column 12, lines 6-13; optimizing the weighting

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function for each nodes until there is minimal error between the final output and the desired output, thus a first credit worthiness is calculated, the level of fitness is determined by error function, the credit worthiness is continuing calculated until minimizing error function).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tom, U.S. Patent No. 5,832,465 in view of the disclosed prior art (see Specification page 14).

Regarding to claim 1, Tom discloses a method for assessing the risk of a borrower defaulting on a financial obligation within a predefined market, comprising the steps of:

receiving a first input indicative of whether the borrower has previously defaulted on a financial obligation (column 4, lines 30-37; receiving bankruptcy indicator);

receiving a second input comprising a plurality of credit factors, the plurality of credit factors comprising a first credit factor and a second credit factor (column 3, line 32-column 4, line 37; column 10, line 51-column 11, line 5; figures 7a, 7b, item

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"Variable"; receiving a plurality of linguistic evidential values as credit factors contain residence, employment, debt, credit, and miscellaneous);

determining, using the first input and the second input, a set of weights, each weight in the set being placed on one of plurality of credit factors (column 4, lines 38-40; column 6, lines 28-31, 62-67; figures 7a, 7b, item "Input Nodes, Input"; column 9, lines 5-15; translating linguistic evidential values into numeric values using weighting function); and

calculating, using the plurality of credit factors and the set of weights, a probability of default for the borrower (column 11, lines 5-20; figures 7a, 7b, item "Output Node, Output"; calculating a credit worthiness or probability of default for the borrower using linguistic evidential values and numeric values);

assessing the risk of the borrower defaulting using the calculated probability of default (column 11, lines 5-24; the output that equivalent to the calculated probability of default is 0.98308, which is an indication of strong credit worthiness, thus the risk of the borrower defaulting is assessed based on the output value).

Tom does not disclose wherein the calculating step comprises multiplying the first credit factor by the weight placed on the first credit factor to produce a first intermediate result, multiplying the second credit factor by the weight placed on the second credit factor to produce a second intermediate result, and summing the first and second intermediate results. However, Tom discloses wherein the calculating step comprises mapping the first credit factor by the weight placed on the first credit factor to produce a first intermediate result, mapping the second credit factor by the weight

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placed on the second credit factor to produce a second intermediate result, and summing the first and second intermediate results. Thus instead of using multiplying function, Tom using mapping function to produce a first intermediate result, a second intermediate result, and summing the first and second intermediate results. Although Tom's functions having different structures, but they have the same purpose for calculating a first intermediate result, a second intermediate result, and summing the first and second intermediate results to produce a probability of default for the borrower. Moreover, Hosmer (*Applied Logistic Regression*, 1989, chapter 1) discloses the logistic function and the regression function for calculating a probability value by multiplying the first credit factor by the weight placed on the first credit factor to produce a first intermediate result, multiplying the second credit factor by the weigh placed on the second credit factor to produce a second intermediate result, and summing the first and second intermediate results (see Specification, page 14). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Tom's equations in the optimizing model for the purpose of providing more efficiency for calculating the probability of default or credit worthiness for the borrower.

Regarding to claims 2, 14, Tom discloses:

setting each of the set of weights to a pre-determined value (column 6, lines 27-37; figures 7a, 7b, item "Input Nodes, Input"; the numeric values have pre-determined values range between -1.0 and 1.0);

setting each of the plurality of credit factors to a randomly selected new value wherein the new value is within a percentage range of the previous value (column 9, lines 20-25);

calculating, using the plurality of credit factors and the set of weights, a first probability of default for the borrower; measuring the first probability of default to determine a level of fitness; determining when the level of fitness is not a good fit; and setting each of the set of weights to a new calculated value when the determining the level of fitness is not a good fit (column 9, line 1-column 10, line 35; column 12, lines 6-13; optimizing the weighting function for each nodes until there is minimal error between the final output and the desired output, thus a first credit worthiness is calculated, the level of fitness is determined by error function, the credit worthiness is continuing calculated until minimizing error function).

Regarding to claim 3, Tom discloses the pre-determined value is zero (column 6, lines 27-37; figures 7a, 7b, item "Input Nodes, Input"; the numeric values have pre-determined values range between -1.0 and 1.0, thus it contains 0).

Regarding to claims 4, 5, 9, 12, 22, Tom discloses using an equation to calculate a value indicative of the combination of the set of weights applied to the plurality of credit factors (column 7, line 12-column 8, line 51; evidence aggregation function); using the value as input into an equation to calculate the first probability of default for the borrower (column 9, line 1-column 10, line 35; weighting function); and using the first input and the first probability of default as inputs into an equation to determine the level of fitness (column 9, line 15-45; error function). Although Tom's equations having

different structures, but they have the same purpose for calculating the combination of the set of weights (evidence aggregation function), calculating the first probability of default or credit worthiness for the borrower (weighting function), calculating the level of fitness (error function). Moreover, it is well known in the art to modify equations using for optimizing model. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Tom's equations in the optimizing model for the purpose of providing more efficiency for calculating the probability of default or credit worthiness for the borrower.

Regarding to claim 6, Tom discloses determining whether the level of fitness can be minimized by more than a pre-determined amount (column 9, lines 40-45).

Regarding to claims 7, 13, 15, Tom does not disclose the level of fitness can be minimized by a pre-determined amount is 10; the new value is within a percentage range is from 0% to 1% of the previous value. However, it is well known in the art to use different values in an equation. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Tom's to include the feature above in the optimizing model for the purpose of providing more efficiency for calculating the probability of default or credit worthiness for the borrower.

Regarding to claims 8, 17, Tom discloses using maximum likelihood estimation iteration to set each of the set of weights to the new calculated value (column 9, lines 40-45; column 12, lines 5-13).

Regarding to claim 10, Tom discloses graphically outputting the probability of default for the borrower (column 5, lines 15-33).

Regarding to claim 11, Tom discloses determining, using the first input, a level of predictive accuracy for the probability of default; determining, when the level of predicative accuracy satisfies a pre-determined threshold, whether the set of weights are unstable; generating, when the determining that the set of weights are unstable, a new of weights to be place on each of the plurality of credit factors; whereby the new set of weights are deemed sufficiently accurate and stable to be used as a basis for assessing the risk of default within the predefined market of different, new borrowers (column 9, line 1-column 10, line 35; column 12, lines 6-13; optimizing the weighting function for each nodes until there is minimal error between the final output and the desired output, thus a first credit worthiness is calculated, the level of fitness is determined by error function, the credit worthiness is continuing calculated until minimizing error function).

Regarding to claim 16, Tom discloses receiving a number of desired iterations input; performing a maximum likelihood estimation iteration the number of times, wherein each of the number of iterations produce a resulting set of weights; and using a stability process to select one of the number of the resulting set of weights (column 9, lines 40-45; column 12, lines 5-13).

Conclusion

11. Claims **1-24** are rejected.
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Nga B. Nguyen whose telephone number is

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(703) 306-2901. The examiner can normally be reached on Monday-Thursday from 9:00AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on (703) 308-0505.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 306-1113.

13. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

C/o Technology Center 3600

Washington, DC 20231

Or faxed to:

(703) 872-9326 (for formal communication intended for entry),

or

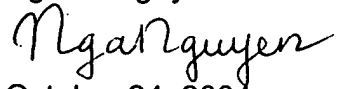
(703) 308-3691 (for informal or draft communication, please label "PROPOSED" or "DRAFT").

Hand-delivered responses should be brought to Crystal Park 5, 2451 Crystal Drive, Arlington, VA, Seventh Floor (Receptionist).

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Nga B. Nguyen

A handwritten signature in cursive script that reads "Nga B. Nguyen". The signature is written in black ink and is positioned below the printed name.

October 24, 2004